

CHM 1107 Winter/Spring 2024

The 'Omics Revolution and Mass Spectrometry

Biology is in the midst of a 'systems' revolution, which emphasizes the evaluation of interactions between hundreds-thousands of biomolecules in parallel. This paradigm, which has spawned the ever-growing number of '-Omics' disciplines, has been driven in part by tools developed by analytical chemists (e.g., microfluidics, multiplexed separations, high resolution spectroscopy). One analytical technique that has had a particularly important role in the revolution is mass spectrometry. In CHM 1107, we take a detailed look at mass spectrometry and associated methods, and survey the state-of-the-art in other analytical tools that are driving the -Omics revolution.

INSTRUCTOR

Rebecca Jockusch (Lash Miller 253, rebecca.jockusch@utoronto.ca)

COURSE SCHEDULE

Please consult the schedule posted on the course website. Regular course meetings will be on *Thursdays 4:10 - 6:00 pm*, beginning Jan. 11. I anticipate that the final day of class will be April 4.

The course schedule is subject to change depending on enrollment.

MODE OF DELIVERY

CHM1107 will primarily be in-person. I highly encourage in-person attendance because I think it helps with discussion and with making connections. That said, I anticipate making a synchronous Zoom session available in case you are unable to attend in person for some reason (travel, experiments, illness etc.). Additional information, including Zoom links, will be posted on the course website.

COURSE STRUCTURE

The course will be a mixture of instructor and student presentations and discussions. Discussions will be centered on recent and seminal research papers in the literature. Each student will make two presentations: one as part of a group near the beginning of the course and an individual "journal club" presentation near the end of the course. Active participation in the course is expected from all students (see below).

WEBSITE

All relevant course information will be posted on the course website available through Quercus: <https://q.utoronto.ca>

MARKING SCHEME

The marks breakdown is shown in the table below.

Participation	20%
Group Presentation	30%
Journal Club Assignment	50%

Note that 20% of the course mark will be assigned for participation. Participation includes contribution to discussions, asking or answering questions, making comments and critiques during and after presentations.

GROUP PRESENTATIONS

Groups (mostly of three, but group sizes may be adjusted for enrollment) will present on current topics important in mass spectrometry. On the first day of class, students will select from a posted set of topics. The number of available topics will depend on course enrollment. Likely topics are alternative ionization techniques for MS; alternative dissociation techniques for MS; ultrahigh resolving power mass spectrometers; ancillary techniques for MS: ion mobility mass spectrometry; labeling strategies. Presentations should be ~45 minutes (+ ~5 minutes for questions) for the groups with three members and ~30 minutes (+ question time) for any groups with two members. More information about this assignment is posted on the course website.

JOURNAL CLUB ASSIGNMENT

Every student taking CHM 1107 is responsible for producing a “journal club”-style presentation. In this lecture, you should describe, explain, and critically evaluate a peer-reviewed paper of your choosing. The paper should (a) be a primary source (i.e., no reviews), (b) should be recent (i.e., 2017 or later), and (c) should be focused on either –Omics or technological or methodological developments in mass spectrometry, or both. More information about this assignment is posted on the course website. The lecture is expected to be 25-28 minutes long (+time for questions). More information about the Journal Club Assignment is posted on the course website.

COURSE POLICIES

Each member of this course is expected to maintain a:

- (i) professional and respectful attitude during all course activities, including classes, laboratories, tutorials, and other online activities.
- (ii) personal calendar/schedule/organizer to ensure that all course activities are completed, and due dates are met.
- (iii) collection of notes recorded independently based on concepts covered in course activities (students registered with Accessibility Services requiring a class note-taker will have access to this accommodation)
- (iv) familiarity with the university policy on Academic Integrity

The University of Toronto is committed to equity, human rights and respect for diversity. All members of the learning environment in this course should strive to create an atmosphere of mutual respect where all members of our community can express themselves, engage with each other, and respect one another's differences. The CHM1107 Teaching team will neither condone nor tolerate behaviour that undermines the dignity or self-esteem of any individual in this course and we wish to be alerted to any attempt to create an intimidating or hostile environment. It is our collective responsibility to create a space that is inclusive and welcomes discussion. Discrimination, harassment, and hate speech will not be tolerated. If you have any questions, comments, or concerns, we encourage you to reach out to the staff in our [Equity Offices](#).

INSTITUTIONAL POLICIES AND SUPPORT

ACADEMIC INTEGRITY

Academic integrity is essential to the pursuit of learning and scholarship in a university, and to ensuring that a degree from the University of Toronto is a strong signal of each student's individual academic achievement. As a result, the University treats cases of cheating and plagiarism very seriously.

The [University of Toronto's Code of Behaviour on Academic Matters](#) outlines the behaviours that constitute academic dishonesty and the processes for addressing academic offences.

All suspected cases of academic dishonesty will be investigated following procedures outlined in the Code of Behaviour on Academic Matters. If you have questions or concerns about what constitutes appropriate academic behaviour or appropriate research and citation methods, you are expected to seek out additional information on academic integrity from your instructor or from other institutional resources (see www.academicintegrity.utoronto.ca/).

COPYRIGHT

If a student wishes to copy or reproduce class presentations, course notes or other similar materials provided by instructors, he or she must obtain the instructor's written consent beforehand. Otherwise, all such reproduction is an infringement of copyright and is absolutely prohibited. More information regarding this is available here: <https://teaching.utoronto.ca/ed-tech/audio-video/copyright-considerations/>

ACCESSIBILITY NEEDS

Students with diverse learning styles and needs are welcome in this course. The University of Toronto is committed to accessibility: if you require accommodations for a disability, or have any other accessibility concerns about the course, please contact Accessibility Services as soon as possible.

ACCOMMODATIONS FOR RELIGIOUS OBSERVANCES

Following the University's policies, reasonable accommodations will be made for students who observe religious holy days that coincide with the due date/time of an assignment, tutorial, class or laboratory session. Students must inform the instructor before the session/assignment date to arrange accommodations.

ADDITIONAL SERVICES & SUPPORT

The following are some important links to help you with academic and/or technical service and support:

School of Graduate Studies' [Policies and Guidelines](#)

Full library service and resources on conducting online research through University of Toronto

Libraries [University Libraries Research](#)

Resources on academic support from the [Academic Success Centre](#)

Learner support at the [Writing Centre](#)

Information for [Technical Support/Quercus Support](#)

ACKNOWLEDGEMENT OF TRADITIONAL LANDS

We wish to acknowledge this land on which the University of Toronto operates. For thousands of years, it has been the traditional land of the Huron-Wendat, the Seneca and, most recently, the Mississaugas of the Credit River. Today, this meeting place is still the home to many Indigenous people from across Turtle Island and we are grateful to have the opportunity to work on this land.